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Operative laparoscopy for the treatment of ovarian remnant syndrome

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Objective: To present the technique and assess the efficacy of operative laparoscopy to manage ovarian remnant syndrome.

Design: Observational with a follow-up of 6 to 32 months.

Setting: Private subspecialty practice with a large referral base.

Patients: Thirteen women, 9 with previous bilateral salpingo-oophorectomy and 4 with previous unilateral salpingo-oophorectomy and pain on the ipsilateral side.

Interventions: Multipuncture advanced operative laparoscopy.

Main Outcome Measures: Patient pain relief was assessed through return examinations, telephone interviews, or contact with referring physicians.

Results: Nine patients reported complete pain relief. One reported incomplete but satisfactory pain relief. Two required bowel resection by laparotomy to obtain pain relief, and one, despite subsequent laparotomy, had persistent pain. No intraoperative or postoperative complications were noted.

Conclusion: Laparoscopy can be effective in managing ovarian remnant syndrome when performed by an experienced laparoscopist. Fertil Steril 1992;57:1003–7

Key Words: Ovarian remnant syndrome, operative laparoscopy, pelvic pain, adhesions, endometriosis

Ovarian remnant syndrome can be defined as pelvic pain in the presence of residual ovarian tissue after salpingo-oophorectomy (1). Although once considered rare, the syndrome is now recognized frequently (2–4). Surgical removal of the ovarian remnant is considered the treatment of choice, although an incidence of complications from 16% to 30% has been reported during laparotomy (5). We report on our experience managing ovarian remnant syndrome with operative laparoscopy.

MATERIALS AND METHODS

Between July 1989 and March 1990, 13 patients presenting with pelvic pain were diagnosed as having ovarian remnant syndrome. All patients were in the premenopausal age range and presented with pelvic pain. The diagnosis was based on preoperative pelvic imaging in 8 patients (vaginal ultrasound [US] in 7, computerized axial tomography [CAT] in 1, Table 1), palpable mass in 2, and intraoperative findings in 3; no cases suspected preoperatively failed to yield ovarian tissue at laparoscopy. Intravenous (IV) pyelograms, obtained in 5 patients by the referring physicians, were negative. After discontinuing exogenous hormones when necessary, 5 patients had estradiol (E_2) and/or follicle-stimulating hormone (FSH) measured preoperatively, and levels were always premenopausal ($E_2 > 30$ pg/mL [6] and FSH < 40 mIU/mL [4]).

Criteria for inclusion were (1) documented previous bilateral or unilateral salpingo-oophorectomy and (2) histologic confirmation of ovarian remnant

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Table 1 Vaginal US or CAT Findings in Eight Patients With Ovarian Remnants

Case no.	Type of imaging	Characteristics	Size	Location
			cm	
1	US	Cystic	2.5 × 1.9	Right adnexa
4	US	Cystic	2.0 × 2.8	Left adnexa
5	US	Complex cyst	5.0 × 3.8	Left adnexa
6	US	Cystic	3.3 × 3.0	Right adnexa
7	CAT	Complex cyst	5.1 × 3.6	Left of vaginal apex
10	US	Cystic	3.1 × 1.7	Right adnexa
11	US	Cystic	2.6 × 2.0	Right adnexa
12	US	Cystic	2.9 × 2.5	Left adnexa

at laparoscopic resection. The patients fell into two groups. The first, who had previous bilateral oophorectomy, included case numbers 2 to 7, 9 to 11. The second, who had only unilateral oophorectomy, consisted of cases 1, 8, 12, and 13. In the second group, both the symptoms and histologically confirmed remnant were on the ipsilateral side. Six to 32 months after laparoscopy, follow-up results were obtained through return examinations, telephone interviews, or contact with referring physicians.

When measuring the elapsed time between previous surgical procedures and our laparoscopy, we noted two distinct categories. Eight patients required repeat operative intervention within 9 months of previous surgery, whereas the other five did not return for 22 to 45 months. Eight patients received a trial of suppressive hormonal therapy before the present surgery, including leuprolide acetate, danazol, medroxyprogesterone, estrogens, and oral contraceptives. Three had previous surgical attempts to remove ovarian remnants, two at laparotomy and 1 at laparoscopy elsewhere.

Our practice is a largely referral based, independent institution. All operations in this series were performed on an outpatient basis in a large community hospital's short-stay surgical suite. Laparoscopy was performed under general endotracheal anesthesia using multipuncture operative laparoscopy (videolaseroscopy) (7–13). Patients received an outpatient bowel preparation 1 day before surgery (12) and were counseled that a laparotomy, colostomy, or bowel resection was possible.

Because all patients in this series had undergone previous laparotomy, the laparoscope was inserted after a mapping technique (12). Intra-abdominal adhesions were lysed, and ovarian remnants were dissected using hydrodissection (11) and videolaseroscopy (9). The anatomy of the retroperitoneal space was identified in all cases involving an ovarian remnant adherent to the lateral pelvic wall; the peritoneum was injected with lactated Ringer's (Baxter Healthcare Corporation, Deerfield, IL) and dissected to the infundibulopelvic ligament remnant (9, 11). Adhesions were lysed until the course of the major pelvic blood vessels and the ureter could be traced and, if necessary, dissected. The ovarian blood supply was then desiccated with bipolar electrocautery and the ovarian tissue incised, removed, and submitted for histologic evaluation (9).

Adhesions involving the bowel surface were injected with lactated Ringer's (Baxter Healthcare Corporation) above the serosa, creating a plane of cleavage and safe zone for laser incision (11). Ovarian tissue embedded in the muscularis of the bowel was removed superficially, but the bowel lumen was not entered. When denuded, the serosa and muscularis layers were imbricated with one to three interrupted 4-0 polydioxanone sutures (Ethicon, Somerville, NJ) in one layer (13).

RESULTS

Pelvic adhesions were noted intraoperatively in all 13 patients (Table 2). Three patients had omental and small bowel adhesions detected with the mapping technique (12); trocar insertion in these cases was left of the midline rather than subumbilical. No bowel injuries occurred during this series.

The operative laparoscopies lasted 90 to 230 minutes (mean 130 minutes). Estimated blood loss was 300 mL in one case, and <150 mL in all others. No serious intraoperative or postoperative complications occurred. All patients were discharged within 24 hours with the exception of patient 12 who underwent a laparoscopically assisted vaginal hysterectomy. This patient was discharged on the 3rd postoperative day.

The tissue removed included endometriosis in four women, a corpus luteum (CL) in 3 patients, only ovarian stroma in three women, and corpora albicans

Table 2 Patient Summaries

Case no.	Patient age	Time from previous surgery	Previous surgery: Procedure	Previous surgery: Pathology	Pathology of ovarian remnant	Size of largest diameter remnant	Pain relief
	y	*mo*				*cm*	
1	37	45	1-OPLS*-uterine suspension	Endometriosis	Right corpus albicans	1.7	Complete
			2-LT†-TAH‡, RSO§	Endometriosis			
2	32	9	1-LT-RSO	Endometriosis	Left CL	2.2	Incomplete
			2-OPLS-LSO‖	Ovarian endometrioma			
3	40	24	1-DXLS¶	Endometriosis	Left ovarian stroma	2.0	Complete
			2-TVH**	Menorrhagia			
			3-LT-BSO††	CL			
4	35	3	1-LT-TAH, RSO, appendectomy	Endometriosis	Endometriosis	1.7	Complete
			2-OPLS	Endometriosis, adhesions	Left follicular cyst		
			3-OPLS-LSO	Endometriosis, adhesions			
5	25	8	1-LT-bilateral ovarian cystectomy	CL	Left partially lutenized follicle/fibromuscular adhesions	5.0	None until bowel resection
			2-LT-RSO	Hemorrhagic CL			
			3-LT-TAH, LSO	Hemorrhagic CL			
			4-LT-resection of ovarian remnant	Ovarian tissue			
6	43	41	1-LT-TAH, LSO, and right ovarian cystectomy	Endometriosis	Right hemorrhagic CL	3.0	Complete
			2-LT-RSO	Endometriosis, adhesions			
7	40	5	1-LT-RSO and adhesiolysis	Adhesions, CL	Left ovarian tissue w/ hemosiderin deposition and endometriosis	3.3	None until bowel resection
			2-OPLS	Adhesions, endometriosis			
			3-LT-left ovarian cystectomy and left tuboplasty	Endometriosis			
			4-LT-TAH, LSO	Adhesions, endometriosis			
			5-LT-adhesiolysis and endometriosis	Adhesions, endometriosis			
8	43	5	1-DXLS	Endometriosis	Left ovarian tissue w/ corpus albicans/ follicle cyst	1.2	Complete
			2-OPLS	Adhesions, endometriosis			
			3-LT-LSO	Adhesions, endometriosis			
			4-OPLS	Adhesions, endometriosis			
9	41	22	1-OPLS	Adhesions, endometriosis	Ovarian tissue, endometriosis	2.0	Complete
			2-LT-TAH, BSO	Leiomyoma, endometriosis			
			3-OPLS for resection of ovarian remnant	Ovarian tissue, endometriosis			
10	34	9	1-LT-LSO, EP	?	Right ovarian tissue and piece of left tube	3.1	Complete
			2-LT-right ovarian cystectomy	Endometriosis			
			3-DXLS	Endometriosis			
			4-LT-TAH, RSO	Endometriosis			
			5-LT-removal of ovarian remnant	Follicular cyst, ovarian tissue			
11	36	4	1-LT-TAH, RSO	Endometriosis	Right ovarian tissue hemosiderin	2.0	Complete
			2-LT-LSO	Adhesions, endometriosis			
12‡‡	39	31	1-OPLS	Adhesions, endometriosis	Left endometrioma	2.0	Complete
			2-OPLS	Adhesions, endometriosis			
			3-LT-LSO-LAVH§§	Ovarian endometrioma			
13	35	6	1-OPLS-adhesiolysis	Adhesions	Right CL	2.0	None; subsequent laparotomy elsewhere also failed
			2-LT-TAH, adhesiolysis and ovarian wedge resection	Ovarian tissue adhesions			
			3-LT-adhesiolysis and RSO	Adhesions CL			

* OPLS, operative laparoscopy.
† LT, laparotomy.
‡ TAH, total abdominal hysterectomy.
§ RSO, right salpingo-oophorectomy.
‖ LSO, left salpingo-oophorectomy.
¶ DXLS, diagnostic laparoscopy.
** TVH, total vaginal hysterectomy.
†† BSO, bilateral salpingo-oophorectomy.
‡‡ During removal of ovarian remnant, this patient also underwent LAVH and RSO for severe pelvic endometriosis.
§§ LAVH, laparoscopically assisted vaginal hysterectomy.

in two patients. It was interesting that three of the patients who failed to obtain complete relief had ovarian remnants consistent with a CL and had not responded to ovarian suppressive therapy.

One patient (no. 2) estimated her pain relief at 80%. Because she considered this rate satisfactory, no additional management was deemed necessary. Two patients (nos. 5 and 7) who failed to obtain relief after laparoscopy had ovarian tissue embedded in the bowel; each patient developed a recurrent mass, and their E_2/FSH levels remained premenopausal. They did experience prompt improvement after laparotomy and bowel resection. A fourth (no. 13) went on to try epidural steroid injections for suspected neural damage and finally underwent laparotomy elsewhere; no additional ovarian tissue was found, and again, no pain relief was noted. The postoperative E_2/FSH levels of all others who had bilateral oophorectomy were postmenopausal after removal of the ovarian remnants.

DISCUSSION

In premenopausal patients who have undergone bilateral oophorectomy, even a small piece of functional ovarian tissue can respond to hormonal stimulation with growth, cystic degeneration, or hemorrhage, and produce the pain associated with ovarian remnant syndrome (6). Interestingly, four of our patients, who had undergone only unilateral salpingo-oophorectomy in the past, experienced ovarian remnant syndrome on the ipsilateral side. Ovarian tissue without blood supply implanted experimentally into the peritoneum of cats became functional and underwent cystic degeneration (14).

The patient histories in our series confirm the difficulty in treating ovarian remnant syndrome. Hormonal suppressive therapy was unsuccessful in eight patients. Three had previous surgical attempts to remove ovarian remnants, two at laparotomy and one at laparoscopy elsewhere. Despite complete ovarian tissue removal during our laparoscopy, later confirmed at laparotomy, one patient never obtained pain relief.

The history of an inflammatory process (endometriosis or adhesions) as the reason for initial surgery and the history of piecemeal removal of pelvic organs at multiple previous operations in our patients match the findings of laparotomy series (2–5). The need for restraint in managing functional cysts is underscored by the fact that some patients had only a CL cyst resected at first laparotomy. Hormonal suppression should eliminate the need for surgery in most CL cysts (15). Laparoscopy has been shown to reduce the incidence of postoperative adhesions (16–18) and should be selected over laparotomy when a simple unilocular ovarian cyst requires surgical resection.

In two patients (nos. 2 and 4), ovarian remnant syndrome followed laparoscopic salpingo-oophorectomy performed elsewhere using the endoloop technique. Initial surgery in both cases included laparotomy with unilateral salpingo-oophorectomy for endometriosis, and the second surgery was an operative laparoscopy. As described by Semm (19), the infundibulopelvic ligament must be free of adhesions so that the endoloop ligature can be placed well below the ovarian tissue. Should the endoloop inadvertently trap ovarian tissue, ovarian remnant syndrome will likely result. We believe these to be the first reported cases of ovarian remnant syndrome after endoloop oophorectomy. Because advanced operative laparoscopy is a recent development, we believe that these two cases found in our small series may signal a common long-term complication of the endoloop technique. We prefer electrodesiccation and transection of the infundibulopelvic ligament or the application of surgical clips (9, 20). When ovaries are densely adherent to the broad ligament, retroperitoneal hydrodissection (11, 12), meticulous adhesiolysis, and removal of peritoneum are essential before performing laparoscopic oophorectomy. When pain persists and ovarian remnants are densely adherent to the bowel, segmental bowel resection is necessary as stated by Webb (2).

When treating patients whose pain persists after oophorectomy, physicians should suspect ovarian remnant syndrome even though the initial examination reveals no physical evidence. None of the remnants exceeded 5 cm. Only two cases were diagnosed by a clinically palpable mass. In three patients, the ovarian remnant was not identified until diagnostic laparoscopy. Clomiphene citrate or human menopausal gonadotropin may be used to increase ovarian remnant size (21) when necessary to confirm the diagnosis preoperatively or locate tissue intraoperatively. We did not administer either of these medications to any patients in this series. Although pelvic imaging did identify remnants in eight cases, all IV pyelograms in our series were negative. The ureter can be readily identified at operative laparoscopy by an experienced endoscopist. Finally, low or borderline levels of FSH in patients with documented bilateral oophorectomy were consistent with the presence of active ovarian tissue (4). Thus, a pelvic US and FSH should be the minimum gyne-

cological work-up. This could prevent many patients from being labeled as having psychogenic disease. When diagnostic laparoscopy is performed on a patient with a previous oophorectomy, a careful intraoperative search for remnants must be included.

Other reviews of ovarian remnant syndrome consider laparoscopy as ineffective in the diagnosis because of dense pelvic adhesions (2, 3, 5). The development of new laparoscopic instrumentation and techniques (7–13) allows these adhesions to be lysed safely by an experienced operative laparoscopist. Access to and removal of the ovarian remnants are now possible even in the most complex cases associated with adhesions, endometriosis, and multiple previous laparotomies. None of the complications commonly reported in laparotomy for ovarian remnant syndrome (5) occurred in this laparoscopic series. When performed by an experienced surgeon, operative laparoscopy is preferable to laparotomy for surgically managing benign pelvic disease because patients have less blood loss, a shorter hospital stay, shorter recuperation period, less expense, and less fear of the procedure.

ADDENDUM

Since concluding this study, we have performed an additional nine laparoscopic ovarian remnant resections with no major complications. Eight patients reported significant pain relief and the ninth was lost to follow-up. In one patient, the remnant involved the wall of the large bowel, and during the resection the bowel was entered. The enterotomy was 1 cm in diameter and was repaired with three through-and-through single layer sutures using 4-0 polydioxanone (Ethicon). Sigmoidoscopy and examination under water confirmed the repairs to be watertight (13). This patient left the hospital on the second postoperative day, and no complications associated with the enterotomy were reported.

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